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Towel Testing

Purpose: To practice the skills used to design experiments

Problem: Many brands of paper towels claim that they are the strongest. Research is needed to determine which brand of paper towel really is the strongest.

Background Information: Since paper towels are usually wet when they are being used, the "wet strength" of the towel is important. Wet strength is the strength of paper when it is wet. This can be measured by the amount of mass that a wet paper towel can hold.

The Task: To design an experimental investigation (a fair test) to test the strength of three different brands of paper towels. You will have these materials to conduct the experiment:

3 Brands of paper towels	1 ball Jar	Water
Graduated cylinder	Pennies	Triple Beam Balance
1 rubber band	eye dropper	



Step 1: Identify the **INDEPENDENT VARIABLE** [what you will change, or the difference between the groups], the **DEPENDENT VARIABLE** [what you will observe and measure, the data that you will collect], and all of the **CONTROLLED VARIABLES** you can think of [all of the variables that could change, but won't].

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✓ Independent Variable:

Type of paper towels

✓ Dependent Variable:

Weight towels can hold

✓ Controlled Variables:

materials, paper towel types, tap water, 20 drops of water in the middle

Step 2: Write a **RESEARCH QUESTION** using *affect* or *effect*.

How will the types of paper towels be affected by the weight.

Step 3: Write a **HYPOTHESIS** that shows the expected *relationship* between the variables. Use an **IF, THEN** statement.

If the Mardi Gras Paper towel is wet then it will hold the most weight.

Step 4: Design an **EXPERIMENTAL INVESTIGATION** to *test your hypothesis*.
Decide:

- ✓ What your specific independent variables are: Paper towel brands
- ✓ What you are going to observe and measure: the weight each one can hold.
- ✓ How you will do the measuring: we will put a rubber band around the beaker pulling the paper towel taut.
- ✓ How many trials you will have: we will have 3 trials for each one.

Step 5: Write the **PROCEDURE** you will follow during your investigation, *step-by-step*.

1. Collect the materials
2. Fill the beaker.
3. Put the rubber band around the beaker and making the paper towel taut.
4. Put 20 mips ^{of top water} on the paper towel above the hole.
5. Measure each tile in grams. Then place them on the parts that are wet. 1 at a time till it breaks.
6. Then add all the grams together and record it in your table.
7. Repeat 2-6 3 times per brand.



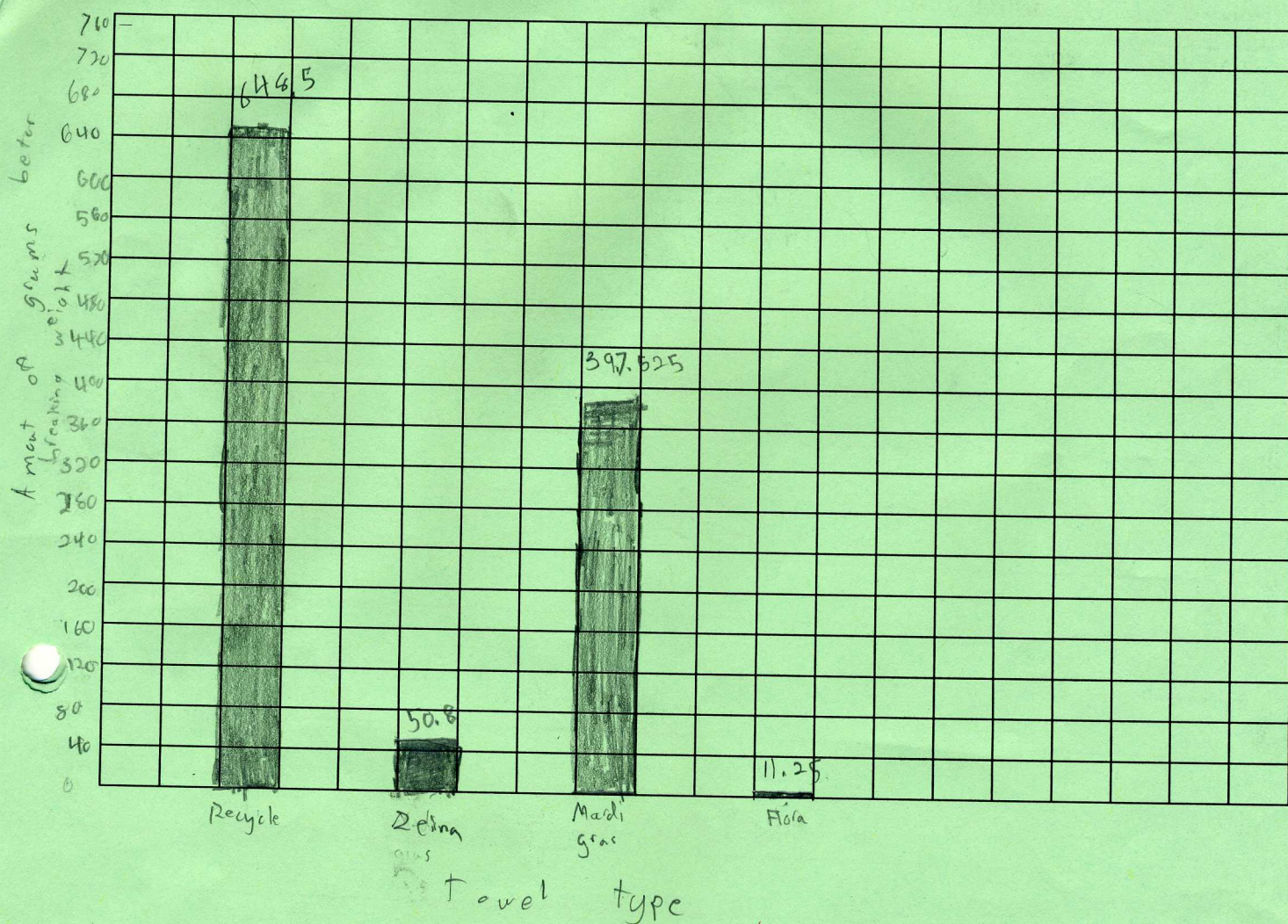
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Step 6: Make the **DATA TABLE** to record your data. Include a place for your *reduced data & measures of central tendency* [average].

	Mass(g)	Mass(g)	Mass(g)
	Trial 1	Trial 2	Average
Reycled	589.4	707.9	648.65
Zeina	78.9	22.7	50.8
Mardi Gras	411.45	383.55	397.525
Flora	11.25	11.25	11.25

Step 7: Make a **GRAPH** of your reduced data. Remember **DRY MIX** and **TAILS**. Explain what type of graph you will use and why.

I am going to make bar graphs of the averages. It is easy to see which towel is stronger.



Step 8: ANALYZE your data: What story does the graph tell? What do you know about the effect of the independent variable on the dependent variable?

Zeina and flora were not able to hold much weight. Recycled held the most weight.

Step 9: Write a **CONCLUSION**. Answer your original questions. Accept or reject your hypothesis. Use actual data [real numbers] to provide evidence for what you say.

My hypothesis was close but not completely correct. The Marli gras held the second most held with 397.525 grams. Recycled paper takes up to 646.5 grams. Flora had the least weight held with 11.25 grams.

more detail / comparison

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